

BIRDS OF A SHADSCALE (*ARTRIPLEX CONFERTIFOLIA*) HABITAT IN EAST CENTRAL NEVADA

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Despite widespread distribution of shadscale (*Atriplex confertifolia*) habitat in the Great Basin Desert (Fowler and Koch 1982), it has been largely ignored by avian ecologists. There are few quantitative assessments of breeding bird populations in these vast areas used primarily for livestock grazing (but see Fautin 1946 for western Utah, Smith et al. 1984 for southwestern Idaho). This information is basic to understanding the ecology of desert birds and the stewardship of their habitats. In this paper I describe breeding bird densities of a shadscale community in the Snake Valley of east central Nevada and compare them with other quantitative studies from shadscale habitats.

STUDY AREA

The study area is located 4 km north of Baker in southeastern White Pine County, Nevada, at a median elevation of approximately 1600 m. The study area is a flat valley bottom bounded by foothills and mountains; there are no seeps, springs, or live streams on the site, although dry washes cross the valley floor. Climatically, the area is a cold desert with cold winters and hot, dry summers. Maximum temperatures in summer frequently exceed 35 C, and minimum temperatures in winter often drop to –29 C (Houghton et al. 1975). Annual precipitation ranges from 10 to 20 cm (Houghton et al. 1975). The area is grazed lightly by cattle trailing to and from spring-fall ranges (R. Jenson, personal communication).

Vegetation in the study area comprises a mixture of low shrubs with a sparse herbaceous component. Dominant shrubs are shadscale, green molly (*Kochia americana*), common winterfat (*Eurotia lanata*), bud sagebrush (*Artemisia spinescens*), and spiny

hopsage (*Grayia spinosa*). Fourwing saltbush (*Atriplex canescens*), black greasewood (*Sarcobatus vermiculatus*), and rubber rabbitbrush (*Chrysothamnus nauseosus*) occasionally occur along shallow washes. Three perennial grasses, Indian ricegrass (*Oryzopsis hymenoides*), galleta (*Hilaria jamesii*), and squirreltail (*Sitanion hystrix*), occur throughout the site. Cheatgrass (*Bromus tectorum*), an annual, is a frequent associate. Plant names follow Holmgren and Reveal (1966).

METHODS

A 20-ha plot was censused for breeding birds using the spot-map method (International Bird Census Committee 1970). A census plot, chosen as the best representative of the shadscale community, was selected by examining the vegetation and topography of the general area. A square plot was surveyed and gridded with points numbered and marked with stakes at 75-m intervals. Ten census visits to the plot were made annually from 29 March to 1 June from 1981 to 1983. Most spot mapping was done from sunrise to early afternoon when birds were most active. Different census routes through the plot were used, with different starting and ending points distributed as evenly as practicable among the visits. To ensure complete coverage, the plot was censused by walking within 50 m of all points on the grid. Recorded bird observations extended a minimum of 75 m beyond plot boundaries.

At the end of the sampling period, clusters of observations and coded activity patterns on species maps were circled, indicating areas of activity or approximate territories. Fractional parts of boundary territories were determined by estimating the portion of each edge cluster that fell within the study plot. Oelke (1981)

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TABLE 1. Passerine breeding bird densities (individuals/ha) in shadscale vegetation, east central Nevada, 1981–1983.

Species	Foraging category ^a	Nesting substrate ^b	Breeding bird density		
			1981	1982	1983
Horned Lark (<i>Eremophila alpestris</i>)	GGO	G	1.28	1.52	1.32
Brewer's Sparrow (<i>Spizella breweri</i>)	GGI	B	0.08	0.10	0.08
Sage Thrasher (<i>Oreoscoptes montanus</i>)	GGI	B	0.02	+ ^c	0.05
	Total individuals/ha		1.38	1.62	1.45
	Biomass (g/ha) ^d		42	49	44
	Species richness (n)		3	2	3

^aAfter DeGraaf et al. (1985): GGO = ground gleaning omnivore, GGI = ground gleaning insectivore.

^bAfter Harrison (1979): G = ground nester, B = bush nester.

^c+ indicates the species was observed infrequently (less than three registrations).

^dSpecies weights from Dunning (1984).

and Verner (1985) summarized methodological and other special problems of the mapping method.

Total bird biomass was calculated annually by summing the products of breeding bird species densities and average bird species body weights (Dunning 1984). Bird nomenclature is from the 1983 AOU check-list (American Ornithologists' Union 1983).

RESULTS AND DISCUSSION

Three passerine bird species bred on the study site (Table 1). By far the most common breeder was the Horned Lark (*Eremophila alpestris*). A permanent resident, this broadly distributed bird occurred throughout the study plot. Less common, and in more restricted locations, were two summer residents, the Brewer's Sparrow (*Spizella breweri*) and the Sage Thrasher (*Oreoscoptes montanus*).

Other species, observed as occasional visitors on or over the study plot during the breeding season, included Northern Harrier (*Circus cyaneus*), Red-tailed Hawk (*Buteo jamaicensis*), Ferruginous Hawk (*Buteo regalis*), Golden Eagle (*Aquila chrysaetos*), American Kestrel (*Falco sparverius*), Prairie Falcon (*Falco mexicanus*), Mourning Dove (*Zenaidura macroura*), Burrowing Owl (*Athene cinicularia*), Short-eared Owl (*Asio flammeus*), Violet-green Swallow (*Tachycineta thalassina*), Cliff Swallow (*Hirundo pyrrhonota*), Barn Swallow (*Hirundo rustica*), Common Raven (*Corvus corax*), Loggerhead Shrike (*Lanius ludovicianus*), Vesper Spar-

row (*Pooecetes gramineus*), Black-throated Sparrow (*Amphispiza bilineata*), and Western Meadowlark (*Sturnella neglecta*).

Horned Lark breeding territories were contiguous on the study plot. From 91% to 95% of the total bird density each year was accounted for by the Horned Lark (Table 1). This species inhabited areas in which the vegetation was open and low growing with considerable bare ground. Horned Larks sang from the ground, while perched, or from the air during nuptial flight displays. Five Horned Lark nests were found during the study; all were placed on the ground in shallow excavations partly beneath or beside a low shrub or grass tussock. Incubating females were first observed on 22 April 1983 and nestlings were last observed on 19 May 1983.

In the Great Basin, Horned Larks are usually most abundant in arid valleys but may occur in suitable habitat on mountain plateaus or in montane fields (Ryser 1985) as well as in cold northern desert scrub, sagebrush, and subalpine grasslands (Behle and Perry 1975).

Brewer's Sparrows were a consistent but relatively minor avian component of the shadscale community in this study (Table 1). As a breeding bird it was largely restricted to scattered clumps of black greasewood, fourwing saltbush, and rubber rabbitbrush occurring near a shallow dry wash that crossed the study site. I found no nests of Brewer's Sparrow but observed singing, courtship, pairing, and other breeding activities. This sparrow normally breeds in big sagebrush (*Artemisia tridentata*) habitats but will also nest in a variety of other suitable shrubs (Short 1984).

TABLE 2. Breeding bird densities (individuals/ha) in shadscale communities of the Great Basin Desert.

Location	Year	Total density	Species	Reference
Southwestern Idaho ^a	1979	1.54	3+	Smith et al. 1984
	1980	1.54	3+	" " "
Southwestern Utah	1984	1.38	2	Medin 1986
	1984	1.39	2	" " "
	1984	0.98	3	" " "
	1984	1.16	3	" " "
Western Utah	1940	1.06	3	Fautin 1946
East central Nevada	1981	1.38	3	This study
	1982	1.62	2	" " "
	1983	1.45	3	" " "

^aIdentified as the salt-desert shrub vegetation type. Shrub species included shadscale, bud sagebrush, common winterfat, black greasewood, fourwing saltbush, Nuttall saltbush (*Atriplex falcata*), and littleleaf horsebrush (*Tetradymia glabrata*).

I recorded relatively low densities of Sage Thrashers in the shadscale community. Sage Thrashers bred on the study plot only two of the three study years (Table 1). Mapped breeding territories included the tallest black greasewood shrubs associated with the dry wash that crossed the area. Sage Thrashers were not common on the study plot, and no nests were found. Although considered by some investigators to be a sagebrush obligate (e.g., Braun et al. 1976), Sage Thrashers occur in other plant communities. Behle and Perry (1975) list the Sage Thrasher as a regular but relatively uncommon bird of the Great Basin desert scrub formation that includes shadscale, black greasewood, and rubber rabbitbrush. Fautin (1946) classified the Sage Thrasher as a summer resident in greasewood habitats of western Utah.

Few other assessments of breeding bird densities in shadscale habitats are available (Table 2). Fautin (1946: 287) reported an average summer population, from actual counts on 4-ha plots, of 1.06 birds/ha in shadscale communities of western Utah. Nesting birds included Horned Larks, Rock Wrens (*Salpinctes obsoletus*), and Black-throated Sparrows. Medin (1986: 570) found total densities ranging from 0.98 to 1.39 birds/ha on several sample plots on the Desert Experimental Range in southwestern Utah. Breeding birds included Horned Larks, Black-throated Sparrows, and Loggerhead Shrikes. Smith et al. (1984: 263) reported a total density of 1.54 passerine birds/ha in a salt-desert shrub community in southwestern Idaho.

Results from my three-year study of breeding bird populations in a shadscale habitat in east central Nevada were numerically similar

to those from shadscale habitats elsewhere in the Great Basin Desert. Overall, the number of bird species breeding on a census plot in shadscale habitats ranged between two and three. Breeding bird densities in shadscale habitats were relatively uniform between years and locations, ranging from 0.98 to 1.62 individuals/ha. But there were pronounced compositional differences in the breeding bird communities. Of several bird species reported breeding in shadscale habitats, only the Horned Lark was common to each census plot. Observed differences in the composition of breeding bird communities may have been related to physiognomic and floristic differences in the vegetation at each location.

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